

What is claimed is:

1. A Fourier transform processing apparatus, comprising:  
a sampling process unit for sampling input signals at a first frequency and sequentially outputting resultant signals;

an averaging process unit for sequentially averaging every predetermined number of signals from the sampling process unit and sequentially outputting resultant signals at a second frequency; and

a Fourier transform process unit for performing a Fourier transform process on the signals from the averaging process unit.

2. A Fourier transform process apparatus according to Claim 1, wherein the first frequency is  $n$  times ( $n$  is an integer equal to or greater than 2) the second frequency and wherein the averaging process unit averages every  $n$  signals from the sampling process unit in the order of input and sequentially outputs signals obtained through the averaging.

3. A Fourier transform process apparatus according to Claim 1, wherein the second frequency is  $2^m$  Hz ( $m$  is a positive integer).

4. A pulse wave detecting apparatus comprising:  
a signal detecting unit for detecting a pulse wave and outputting pulse signals associated therewith;

a signal sampling process unit for sampling the pulse

signals from the signal detecting unit at a first frequency and sequentially outputting resultant signals;

an averaging process unit for sequentially averaging every predetermined number of signals from the signal sampling process unit and sequentially outputting resultant signals at a second frequency;

a signal Fourier transform process unit for performing a Fourier transform process on the signals from the averaging process unit; and

a pulse rate calculation process unit for calculating a pulse rate based on the result of the process at the signal Fourier transform process unit.

5. A pulse wave detecting apparatus according to Claim 4, further comprising;

a noise detecting unit for detecting kinetic noises and outputting noise signals associated therewith;

a noise sampling process unit for sampling the noise signals from the noise detecting unit at the second frequency and sequentially outputting resultant signals; and

a noise Fourier transform process unit for performing a Fourier transform process on the signals from the noise sampling process unit, wherein the pulse rate calculation process unit calculates a pulse rate based on signals output by the signal Fourier transform process unit and the noise Fourier transform process unit.

6. A pulse wave detecting apparatus according to Claim 4, wherein the first frequency is  $n$  times ( $n$  is an integer equal to or greater than 2) the second frequency and wherein the averaging process unit averages every  $n$  signals from the signal sampling process unit in the order of input and sequentially outputs signals obtained through the averaging.

7. A pulse wave detecting apparatus according to Claim 4, wherein the second frequency is  $2^m$  Hz ( $m$  is a positive integer).